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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/736,581	12/17/2003	Satoshi Yamamoto	Q78469	4481

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EXAMINER

GURLEY, LYNNE ANN

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 09/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary

Application No.

10/736,581

Applicant(s)

YAMAMOTO ET AL.

Examiner

Lynne A. Gurley

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 12-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.


Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.


LYNNE A. GURLEY
PRIMARY PATENT EXAMINER
TC 2800, AU 2812

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the response/remarks filed 8/22/05.

Currently, claims 1-14 are pending. Claims 12-14 are withdrawn.

Claims 12-14 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 8/13/04.

Response to Amendment

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, **the finality of that previous Office Action is withdrawn.**
2. The non-final office action is as follows:

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings are objected to because Figures 1A-1C should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one

figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: 1) the step of removing the protective layer from the electroconductive film and the substrate (or, from the electroconductive film on the first surface of the substrate) is not disclosed in the specification, although it is in the originally presented claims 4-5.
2. 2) Additionally, the step of the first pressure being higher than a second pressure on a side of the electroconductive film facing the protective member is not disclosed in the specification, although it is in the originally presented claim 7.
3. 3) Finally, the step of the electroconductive film and the electroconductive substance being different materials is not specifically disclosed, in that the electroconductive film may be

Art Unit: 2812

Cu (page 5, second to last paragraph) and the electroconductive substance may be Cu paste (page 7) if the printing method is used (originally presented claim 11). This combination would give both the film and the substances being made of the same material. Correction is required.

4. The disclosure is objected to because of the following informalities: on page 5, line 8, "silicone oxide" should be "silicon oxide" (See page 9, line 4 for agreement). Appropriate correction is required.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 7, 9-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Specifically, it is not understood how the second pressure on the side of the electroconductive film facing the protective member is lower than the first pressure. The first pressure appears to be caused by the insertion of the electroconductive substance into the micropore. If the first pressure were higher than the second pressure, it would seem that the

Art Unit: 2812

electroconductive film would be lifted during the deposition of the electroconductive film.

Clarification and/or correction are requested.

8. The step of forming “an insulating layer on sidewalls of said micropore” (claim 9, line 3) is indefinite in that this is the same insulating layer on the sidewalls of the micropore as in claim 1. “forming said insulating layer on sidewalls of said micropore” is suggested. Otherwise, it appears as if Applicant is claiming an additional (non-disclosed) insulating layer on the sidewalls and the first and second surfaces to the insulating layers claimed in claim 1. Correction is required.

9. Additionally, “forming an insulating layer on said second surface of the substrate (claim 10, line 3) and “forming an insulating layer on said first surface of the substrate” (claim 10, line 5) are indefinite as well for similar reasoning. Correction is required.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 4, 6, and 8-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Sugihara (US 2002/0192939, dated 12/19/02, filed 6/14/02).

Sugihara shows the method as claimed in figures 5A-5G and corresponding text, with electroconductive film Cu and protective film Ni/Au (figs. 5A-5B), micropore (fig. 5C, bump hole) through the substrate, and electroconductive substance Ni bump/Au (fig. 5D). The

Art Unit: 2812

protective member (Au/Ni) is removed from the Cu electroconductive film on the first surface of the substrate (and after the electroconductive substance is inserted into the micropore), in fig. 5F, by the resist pattern (note that this interpretation is not precluded even though the etching step also removes part of the electroconductive film as well. The Au/Ni layer will be removed over the Cu layer during the etching step.). A first pressure (due to the deposition itself, no matter how small) is naturally or, inherently, applied to a side of the electroconductive film facing the first aperture of the micropore, when the electroconductive substance is inserted and, the protective member Au/Ni holds the electroconductive film in place when the first pressure is applied to the side of the electroconductive film facing the first aperture of the micropore.

3. Claims 1, 6 and 8-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Takao (US 2004/0137701, dated 7/15/04, filed 10/14/03).

Takao shows the method as claimed in figures 10-17 and corresponding text, with substrate 210, electroconductive layer 211, protective layer 212/213, micropore 217, and electroconductive substance 217 (fig. 15). Insulating layer 230/218 is formed as a liner on the inside of the micropore. A first pressure (due to the deposition itself, no matter how small) is naturally or, inherently, applied to a side of the electroconductive film facing the first aperture of the micropore, when the electroconductive substance is inserted and, the protective member holds the electroconductive film in place when the first pressure is applied to the side of the electroconductive film facing the first aperture of the micropore.

Art Unit: 2812

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 2-5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takao (US 2004/0137701, dated 7/15/04, filed 10/14/03).

8. Takao shows the method substantially as claimed and as described in the preceding paragraph. Additionally, Takao teaches that the protective member, which in part, is an additional substrate, is only used to protect and bolster the substrate [0076].

9. Takao lacks anticipation only in not teaching that the electroconductive substance is deposited by molten metal insertion method, or printing method; that the protective member is removed from the electroconductive film and the substrate or removed by heating the substrate;

Art Unit: 2812

that the first pressure is higher than a second pressure on a side of the electroconductive film facing the protective member; and, the associated parameters.

10. It would have been obvious to one of ordinary skill in the art to have had the electroconductive substance be deposited by molten metal insertion method, or printing method; to have had the protective member removed from the electroconductive film and the substrate, or removed by heating the substrate; to have had the first pressure be higher than the second pressure and, to have had the associated parameters, in the method of Takao, with the motivation that since copper is used as the metal to fill the micropore, copper paste is well known to be used in conventional printing deposition methods and, would result in similar or improved coverage of the contact. Additionally, if an alternate conductor were chosen to fill the micropore, for reasons of improved conductance/resistance, electromigration, and step coverage, deposition by molten metal insertion, printing and/or pressure methods would be possible and/or desirable, since they are conventional alternative deposition methods; and, with the motivation that the protective layer may be removed after its function has been served, using heating or other methods, perhaps during or, after dicing, especially since Takao acknowledges that the protective member is used for support purposes. It is conventional to remove such layers after they have served their purpose; and, with the motivation that the rigidity of the protective member is the pressure it imposes on the electroconductive film. As long as no additional stress is applied to it, there should be no additional pressure to be greater than the first pressure, in so much as the limitation is understood (see rejection under 112 paragraph 2 above).

Response to Arguments

11. Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

However, to clarify the Examiner's position with respect to Applicant's remarks, pages 3-4, the Examiner takes the position that the protection layer is removed from the electroconductive film and the first surface of the substrate (after forming the electroconductive substance) in Sugihara. In Sugihara, the protective member (Au/Ni) is removed from the Cu electroconductive film on the first surface of the substrate (and after the electroconductive substance is inserted into the micropore), in fig. 5F, by the resist pattern (note that this interpretation is not precluded even though the etching step also removes part of the electroconductive film as well. The Au/Ni layer will be removed over the Cu layer during the etching step.). Note also that Claim 1 does not specify when the layer is removed. So, the layer being removed at anytime after its formation is not precluded.

In response to Applicant's remarks, page 4, Ni plating is a form of inserting the electroconductive substance into the micropore.

Also, in response to the remarks, page 4, "bonding a protective member to the electroconductive film for protection from the pressure of inserting the electroconductive substance" is not claimed.

12. The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the

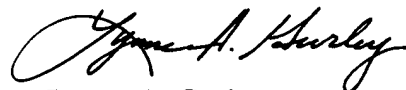
Art Unit: 2812

knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the Examiner has explained in the preceding paragraph that the removal of the protective member is obvious since Takao has acknowledged this layer to be for support purposes during subsequent steps. It is conventional to remove such layers after they have served their purpose.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne A. Gurley whose telephone number is 571-272-1670. The examiner can normally be reached on M-F 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on 571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Lynne A. Gurley
Primary Patent Examiner
TC 2800, Art Unit 2812

LAG
September 9, 2004